

The Skull of the Musk Duck, showing its main features from above, natural size.

The nearest breeding place to Adelaide at present is probably Buckland Park, near Port Gawler, although many years ago they commonly occurred at the Reedbeds and on the lower reaches of River Torrens. They also breed in the far north of the State in favorable seasons. The Musk Duck lays three to six pale green, slightly glossy eggs, each about $3\frac{1}{2}$ inches long, and the breeding season extends from August to December.

The Musk Duck is confined to the southern half of the Australian continent, including Tasmania, and there has only been one sporadic record of it north of the tropic of Capricorn, viz., at the Herbert River, North Queensland, in 1910³.

In South Australia it has been reported in the far north at Lake Goyder, at Lyndhurst, and at other places, while it also occurs all along the River Murray, on the lakes at the Murray mouth, on the Coorong, in the south-east on most of the larger stretches of water, on Eyre Peninsula and the West Coast, and on Kangaroo Island.

Details of the specimen figured are: loc., Tailem Bend, S. Aust.; 24th August, 1938; total length 73 cm.; wing spread 96 cm.; weight 6 lb. 12 oz.; iris almost black; inside mouth flesh pink. Now mounted in the South Australian Museum.

- (1) See "Emu," vol. I, p. 147 (C. G. Hamilton, Perth, W.A.).
 (2) P.Z.S., Lond., 1882, p. 455.
 (3) Broadbent, K. "Emu," 10, 1910, p. 233-245.

Land Shells from the Northern Flinders Range

By

BERNARD C. COTTON

Conchologist, South Australian Museum.

In October, 1938, H. M. Cooper collected some 3,000 dead land shells from the Northern Flinders Ranges, at fifty-one different sites. Although a search was made immediately after a fall of $2\frac{1}{2}$ inches of rain during this same month, great difficulty was

encountered in finding even half a dozen living specimens; bleached shells, however, were there in numbers about Blinman, even on the very tops of the ranges. E. Roberts, of Moolooloo South Station, reports that about twenty-five years ago, when there was still an

abundance of natural bush around Blinman, live native snails were so abundant after good seasons as to provide, on occasions, food for domestic fowls. F. W. Roberts, of Blinman, while obtaining slates for building purposes, noted about the same time large quantities of *Meracomelon* sheltering in crevices of rock in the Parachilna Pass.

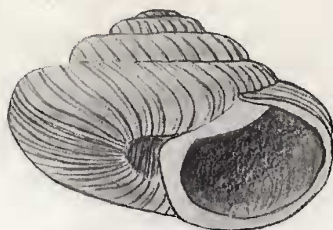
E. Pumpa, of Hawker, recalls ploughing up many native snails on his father's farm near that township some 40 years ago. A station hand now employed by Mr. French of Buckaringa, north of Quorn, states that years ago after a heavy rain on Yadlamalka Station, 50 miles north of Port Augusta, he saw numerous live snails moving about.

Old residents of the Blinman district state that in the past the bulk of rain fell in the

was in 1937, when 12.82 inches fell, but only 4.63 during April-September.

The extremely uncertain climatic conditions in this arid area and the consequent control effected on the ebb and flow of life generally is remarkable, yet understandable when one knows that, for example, a maximum of 21.53 inches fell in 1920, and only 4.47 inches in 1935, during the great drought. April-September figures varied between 10.46 inches in 1909 and only 1.84 inches in 1929. It appears that the land snails peculiar to this locality have suffered a severe setback from the drought years 1933-36 from which they have not yet recovered.

Since the above was written a further trip to this area was made under very different conditions during June, 1939.



A New Land Shell: *Pleuroxia cooperi*, sp. nov., from the Northern Flinders Ranges.

winter months, when almost every gully had running water, and soaks appeared on many hill sides. Rains and mists often occurred for several days in succession and conditions were therefore favorable to snail life.

On checking the rainfall statistics for this area we find that the average rainfall over seventy years is 11.65 inches, but varies greatly from year to year. It reached a maximum sixty-six years ago, in 1872, of 23.46 inches, and a minimum in 1935 of 4.47 inches. During the last fifteen years there has been a decidedly dry winter period. For instance, the total April-September rainfall for the three years 1934-1936 was two inches less than the amount for the corresponding period of 1909 alone. Furthermore, the average annual rainfall has only once been reached during the last sixteen years; that

Twelve inches of rain had fallen by June for 1939, which is more than fell during two whole years of the drought. Living specimens of all four species of land snails common to this area were taken in numbers, although prior to the rains they were almost impossible to locate alive.

The large number of living juvenile *Meracomelon meridionale suspectum* taken is significant. Prism Hill, a small outlier of the Northern Flinders Ranges, is located a few miles eastward of the ranges and five miles to the southward of Wortaloon Head Station. The hill, about 250 feet in height, is a razor back ridge, composed of loose outcrops of rocks with some scanty vegetation on the slopes and summit. At its foot runs the Moro Creek, a gum creek typical of these regions. This in turn enters Weetowie Creek.

and then into Lake Frome. A very small and isolated colony of *Pleuroxia cooperi*, sp. nov. exists (or existed) on the summit of Prism Hill. A prolonged examination produced only a dozen dead shells.

A third collecting trip to this area has now brought the total number of shells collected to 3,000 and the sites number 77, ranging from Port Augusta to Lyndhurst, and from Lake Torrens to Lake Frome. As many localities (some type localities) given for South Australian land snails are vague or inaccurate, a few of the more interesting species and localities for this area are given here. Heights above sea level are also given in some instances.

PLEUROXIA COOPERI

sp. nov.

Shell small, spire slightly elevated, depressedly subdiscoidal, umbilicus very wide, not hidden by reflected columella; radially coarsely, slightly irregularly ribbed, almost smooth except for a subordinate grained sculpture, axial ribs number forty on the body whorl.

Holotype. Summit of Prism Hill (250 feet above sea level), South Australia. Reg. No. D. 13765, S.A.M. Height 10 m., width 16 mm.

The species is nearest to *Pleuroxia arcigerens*, Tate, from Central Australia, but it is smoother, smaller, higher and more regularly axially sculptured.

The colony appears to have died out recently on the hill, which is an outlier of the North Flinders Ranges.

FAMILY VERTIGINIDAE.

Australbinula margaretae Cox.

Narrina Head Station, 1,500 feet. (One juvenile). Four miles south of Beltana. *Themapupa beltiana* Tate. Four miles south of Beltana.

Themapupa ischna Tate. Four miles south of Beltana.

Themapupa adelaidae Angas.

Four miles south of Beltana, numerous specimens. Oratunga Creek. One mile south-east of Quorn. Eleven miles north of Quorn. *Omegapilla australis* Angas. Four miles south of Beltana.

FAMILY SUCCINEIDAE.

Austrosuccinea australis Ferussac.

Ten Mile Creek, Wirrealpa. Parachilna Creek. Mount Chambers Gorge. Wirreanda Creek. Thirteen Mile Creek, 8 miles west of Blinman. It is reported by Mr. Bell, of Stokes Bay, Kangaroo Island, that this species is eaten here by domestic fowls.

FAMILY MICROCYSTIDAE.

Echonitor albumenoides Cox.

Slope of Mount Arden, 2,000 feet. Living shells are horn colored, not milky-white.

FAMILY HADRIDAE.

Meracomelon subloriolanum Pilsbry.

Warrens Gorge, 1,000 feet. Mount Arden.

Meracomelon loriolanum Pilsbry.

Port Augusta West. Specimens are very large, being up to 36 mm. in major diameter. *Meracomelon meridionale* Gude.

Four miles south of Blinman, 1,200 feet. Mount Mary, eleven miles west of Blinman. Nildottie Springs, 6 miles north-east of Blinman. Junction of Oratunga and Parachilna Creeks, about 9 miles east of Parachilna, 1,600 feet. Wonoka Creek, 5 miles north of Hawker. Eight miles south of Blinman, 1,700 feet. This species lives in colonies on the plains.

Meracomelon meridionale suspectum Iredale. Parachilna Creek Cliffs, 6 miles south-west of Blinman. Thirteen Mile Creek, 8 miles west of Blinman. Werta Creek, 12 miles west of Blinman, 1,300 feet. Between cliff ledges above creeks, never on the plains.

Meracomelon (Findomelon) luteofuscum Cox.

Mount Chambers Gorge, numerous specimens. *Meracomelon (Contramelon) howardi* Angas. Mount Chambers Gorge, numerous specimens.

FAMILY XANTHOMELONTIDAE

Sinumelon remissum Iredale.

Motpena, 9 miles east of Lake Torrens. Castle Creek, 7 miles north-west of Willochra, 800 feet. Brachina, 450 feet. Seven miles west of Parachilna, 400 feet. Edeowie, 400 feet. Lyndhurst, 450 feet. Puttapa Creek. Willochra.

Sinumelon godfreyi Iredale.

Woodendinna Springs, 8 miles north-east of Blinman. Limestone Springs, west of Lake

Frome. Wildowildina, 1,500 feet. Narrina Head Station, 1,500 feet. Emu Springs, west of Lake Frome. Wirrealpa. *Notobadistes flindersi* Angas. Ten miles south-east of Hesso. Two miles south-west of Port Augusta. Six miles north-west of Port Augusta. *Notobadistes aversum* Iredale. Two miles south-east of Blinman. Ten Mile Creek, Wirrealpa. Nildottie Springs, 6 miles

north-east of Blinman. Glass Springs, 4 miles north-west of Blinman. Third Waters, Oratunga Creek, 8 miles north-west of Blinman. Emu Springs. Rocky Water Hole, 3 miles south-east of Blinman. *Pleuroxia phillipsiana* Angas. Mount Painter (T. Harvey Johnston), numerous specimens. *Pleuroxia cooperi* Cotton. Prism Hill, 250 feet.

Some South Australian Water Plants

By

C. M. EARDLEY.

There is considerable variety in aquatic vegetation, it includes many true flowering plants, others related to ferns, besides a large group called *algae*; the majority of the seaweeds are algae, so are the filamentous, green pond slimes and scums and also a great many microscopic plants, composed only of a few cells, which inhabit fresh water.

It is the purpose of this article to concentrate attention on the aquatic flowering plants, so only a very few of the less advanced water plants will be mentioned. The first of these is *Chara* and the closely related genus *Nitella*, called *stoneworts* because their remains take part in the formation of freshwater limestone; the plants are able to do this by reason of the quantity of lime encrusting their cells. The calcareous, brittle character of *Chara* is very evident in the dried and bleached remains sometimes found at the edge of a drying pool in summer. Members of the *Characeae* are to be found in fresh and brackish waters all over the world, they are usually crisp-looking plants of a glassy green, having their stems with whorls of short branches at regular intervals. They appear to be related to the algae, but have a very unusual and complicated type of reproductive body, these may be seen as orange dots on the smaller branches. *Chara* or *Nitella* can be found in most ponds and creeks near Adelaide.

The ferns are a step higher in the plant world, and at least two genera of that group are quite common and familiar water plants,

though from their appearance, one would hardly suspect them of being related to the ferns. One of these is the Nardoo (*Marsilia*), whose leaves look rather like a large, four-leaved clover. Nardoo grows in claypans and lagoons in the drier regions of Australia, one of its chief characteristics is that of being able to grow to maturity very rapidly after a fall of rain; spores are produced in a small, brown sporocarp which has very hard walls and looks like a seed, these sporocarps are to be found in quantity in a dried-up claypan, and they are collected and ground by Aborigines to produce a kind of flour. When the sporocarps are slightly cracked and soaked in water, a jelly-like slime string is forced out of the hard coat, this is the beginning of the rapid life cycle.

The other fern ally so well known as a water plant is the Murray Duckweed (*Azolla*). It is a small floating plant made very conspicuous by its habit of occurring in large masses on the surface of quiet and sheltered waters; the individual plant is no bigger than a small coin and has a neat dense, branching structure with short roots hanging down below. The leaves overlap each other like scales, concealing the stem. The Murray Duckweed is either green or a beautiful red in color and, as one might expect from its common name, grows freely in the River Murray.

We now come logically to a consideration of some of the true aquatic flowering plants or aquatic *angiosperms*. The terrestrial habit is,